

Station 1 – General Astronomy

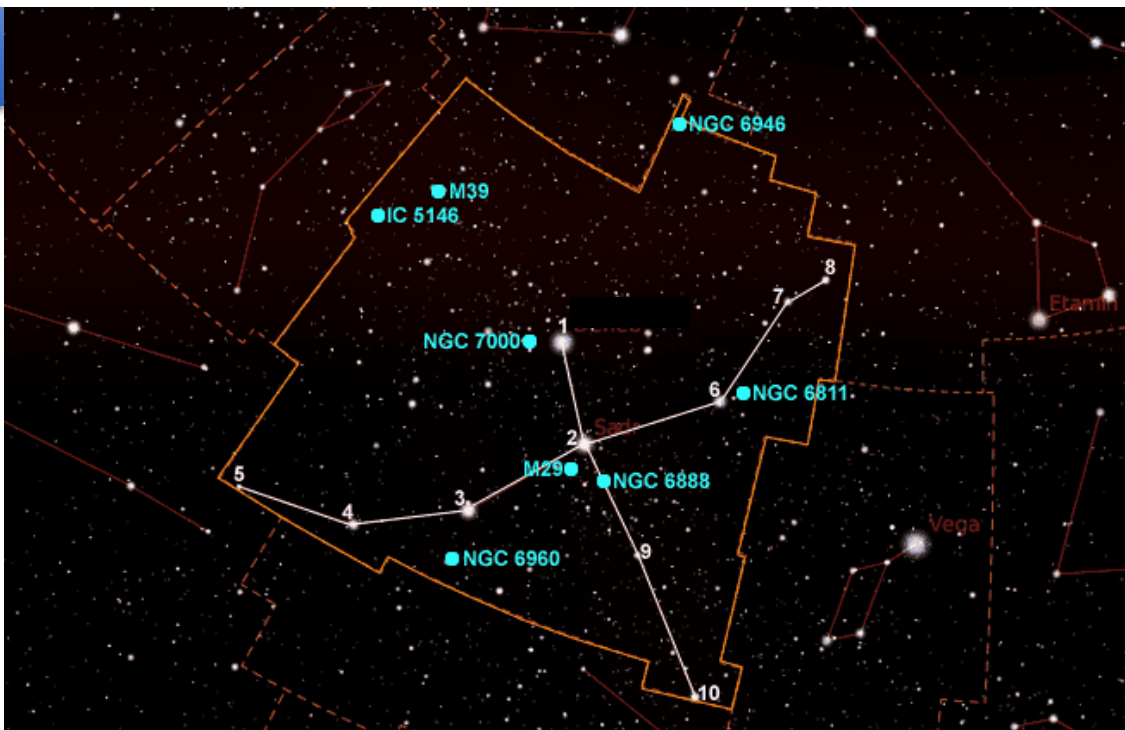
1. What does NGC stand for in various Deep Sky Object names?
2. A: What abbreviated unit of distance is defined as $(648000/\pi)$ AU?
B: Expand the abbreviation
3. A: What is an Astronomical Unit (AU)?
B: How many light minutes in an AU?
4. What is the approximate value of 1 AU in miles?
5. How many AUs in a lightyear?
6. Upon launch in 1990, if the first thing Hubble Telescope was pointed to was Castor, and the Hubble observed it become a supernova, what year did Castor actually become a Supernova?

Station 2 – Identify Constellations Set 1

7



8 A



8B

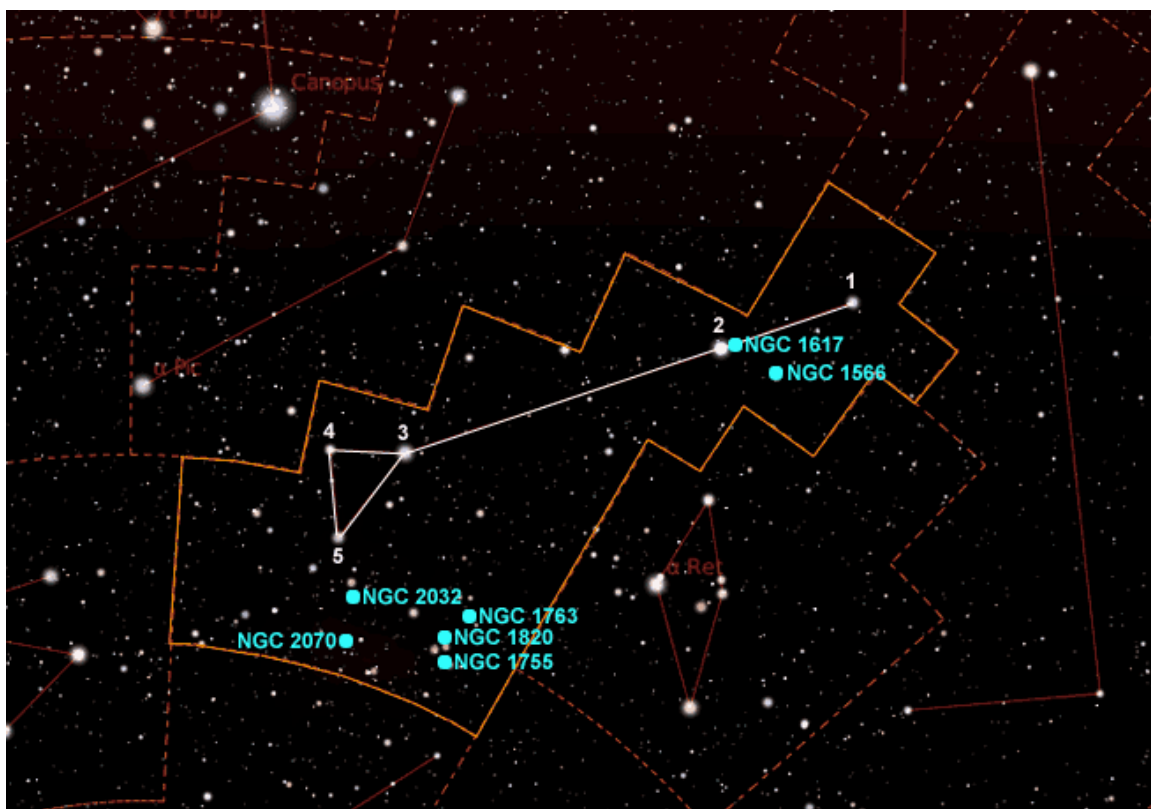
During Michigan summer night, where in the sky would you find this constellation?

8C

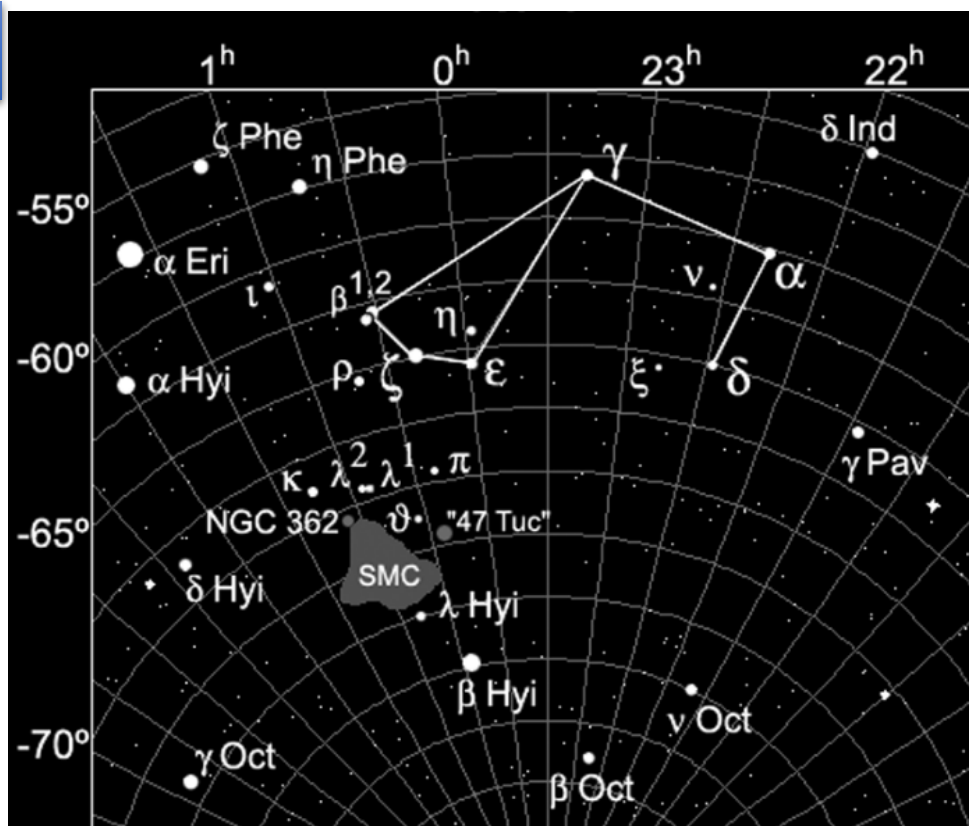
What will you see in the background of this constellation?

Station 2 – Identify Constellations Set 2

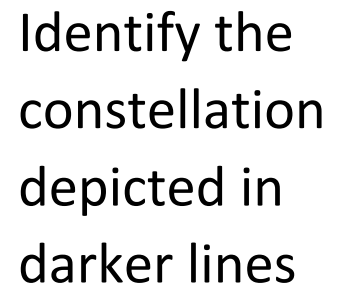
9



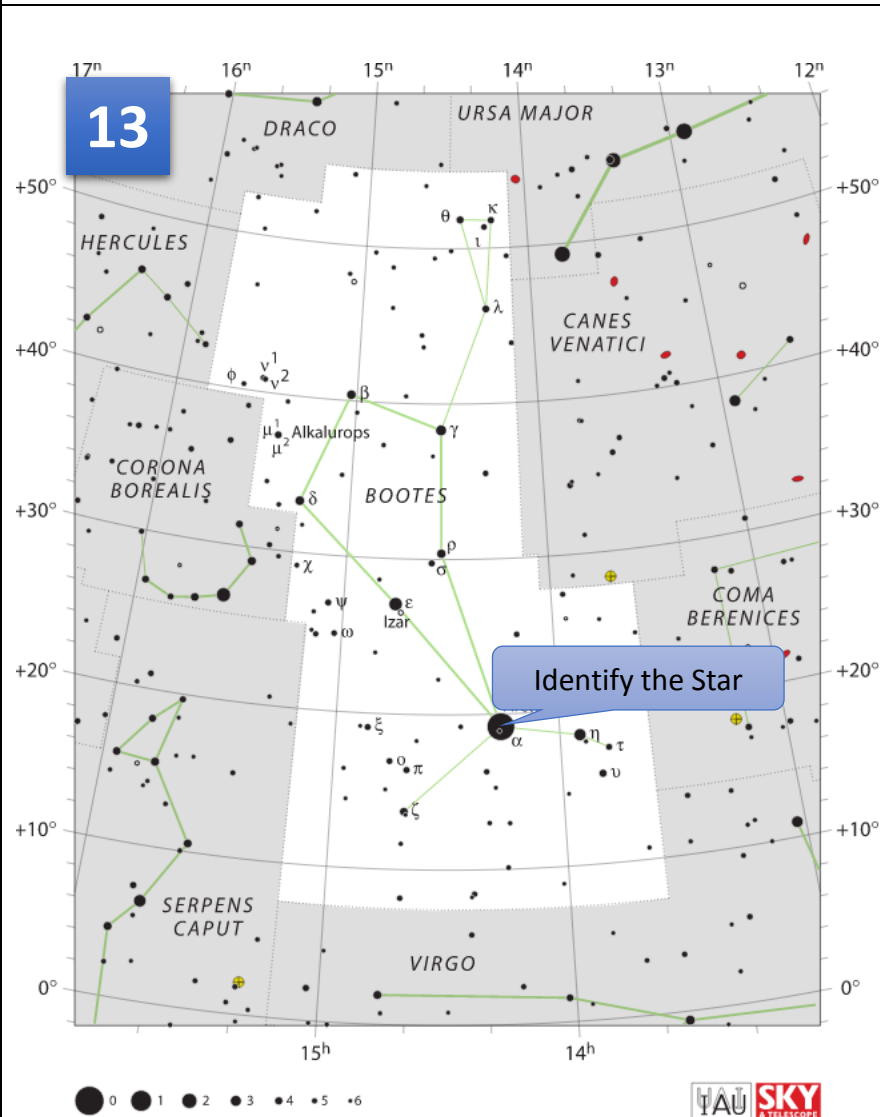
10



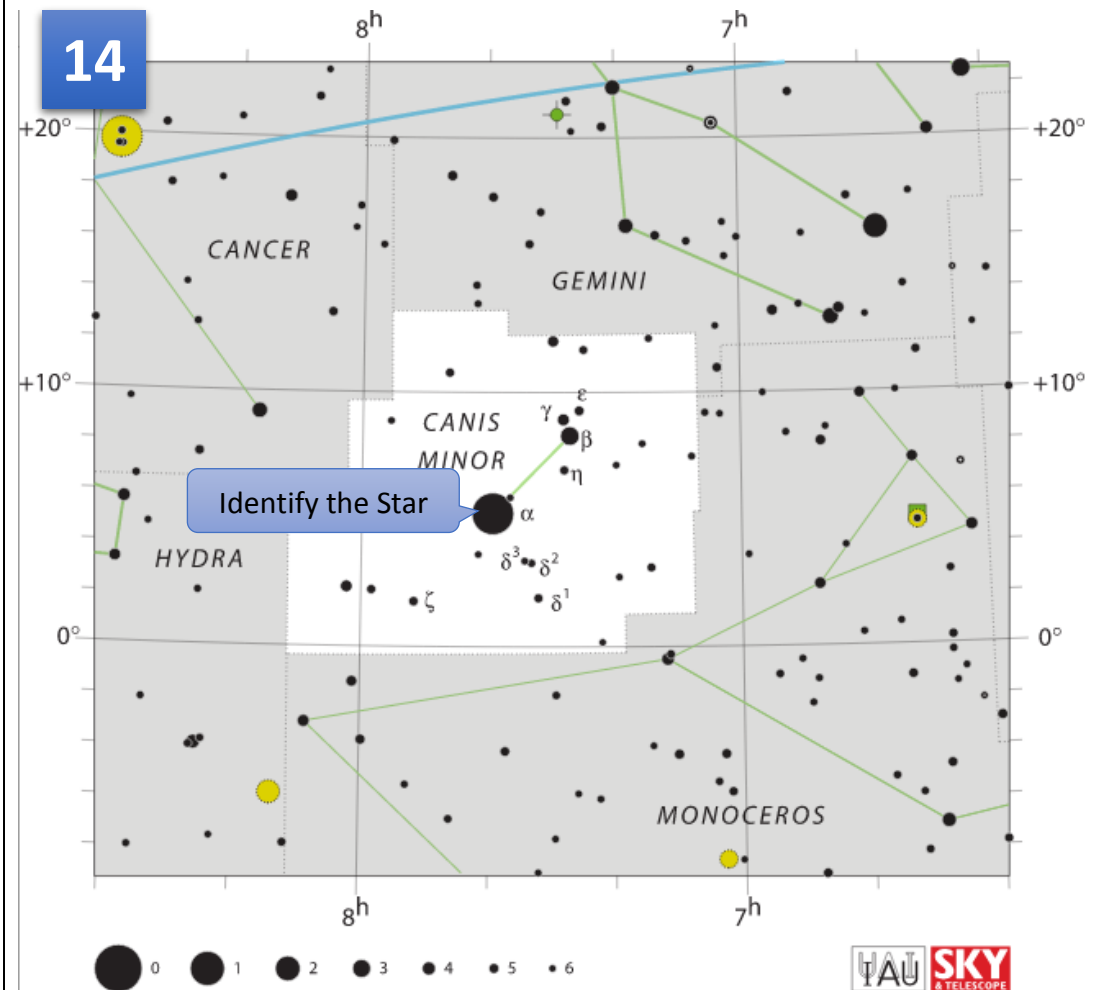
11



Station 3 – Identify Stars - Set 1

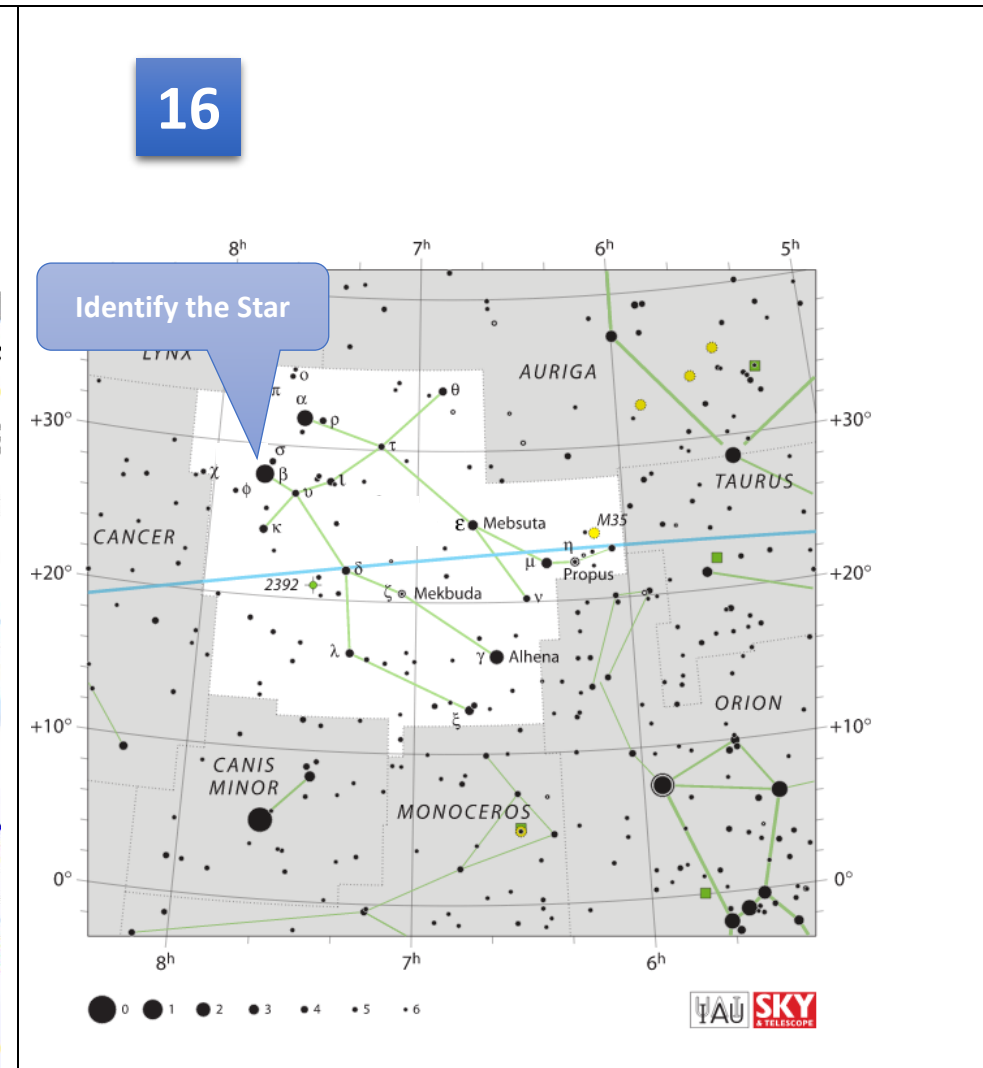
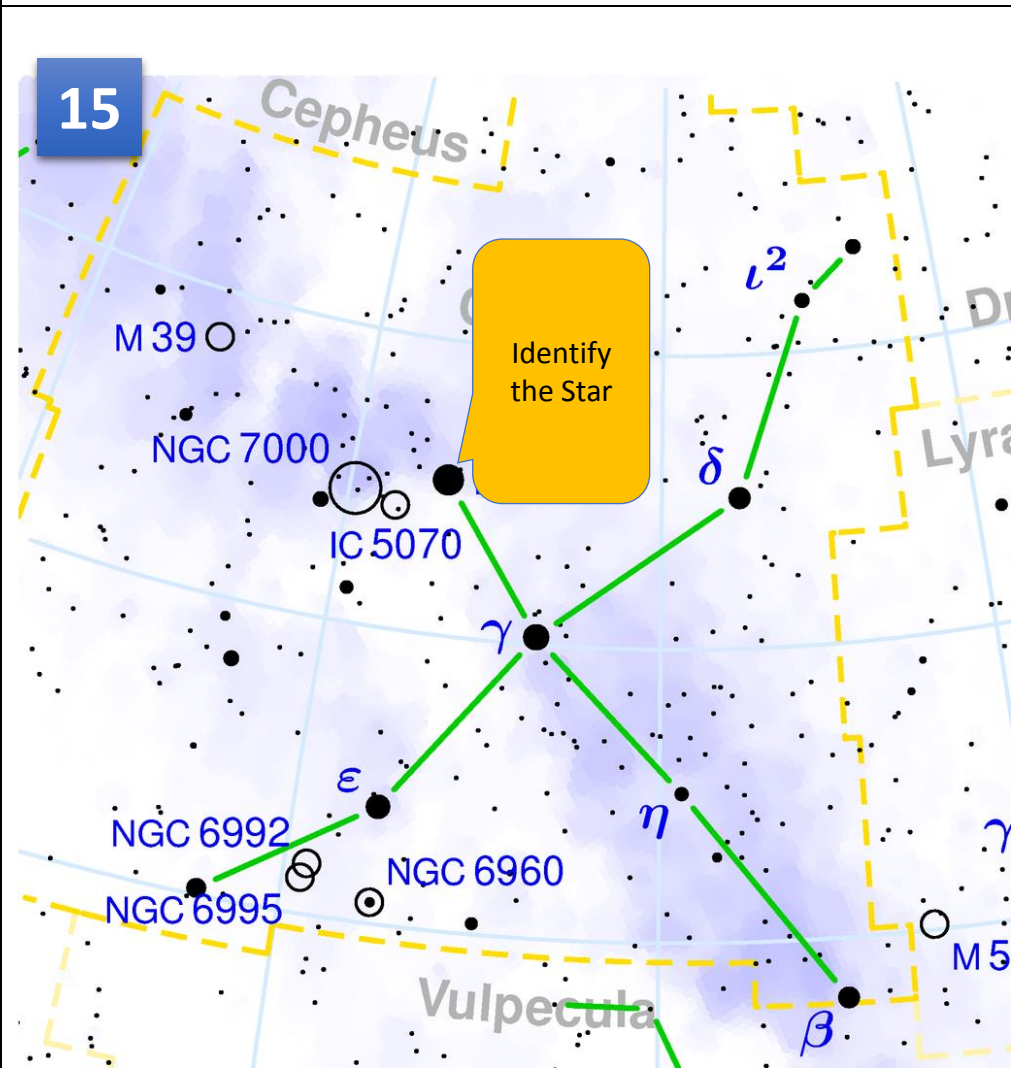


Provide two names for this star

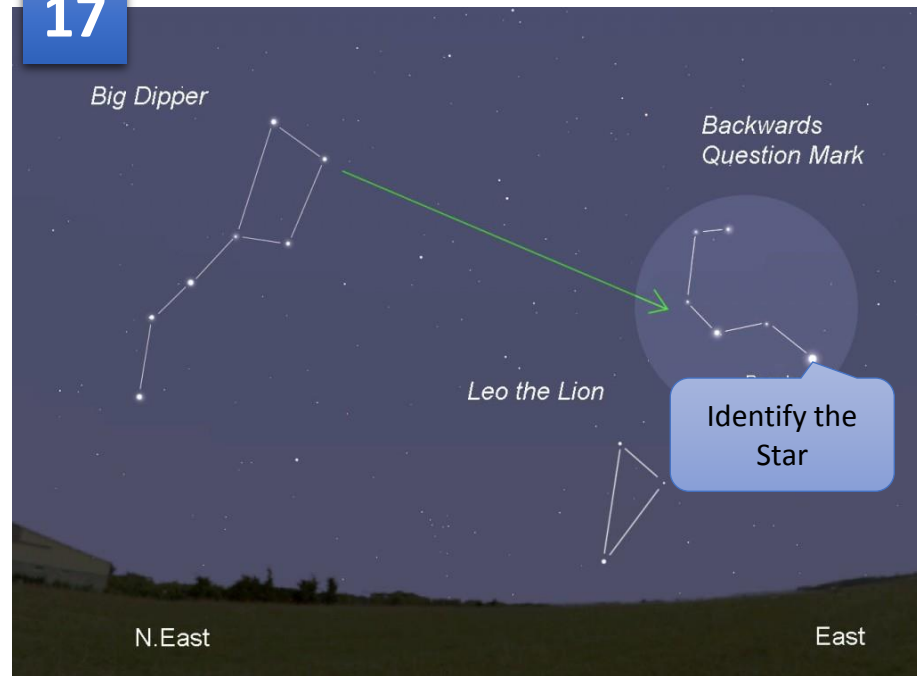
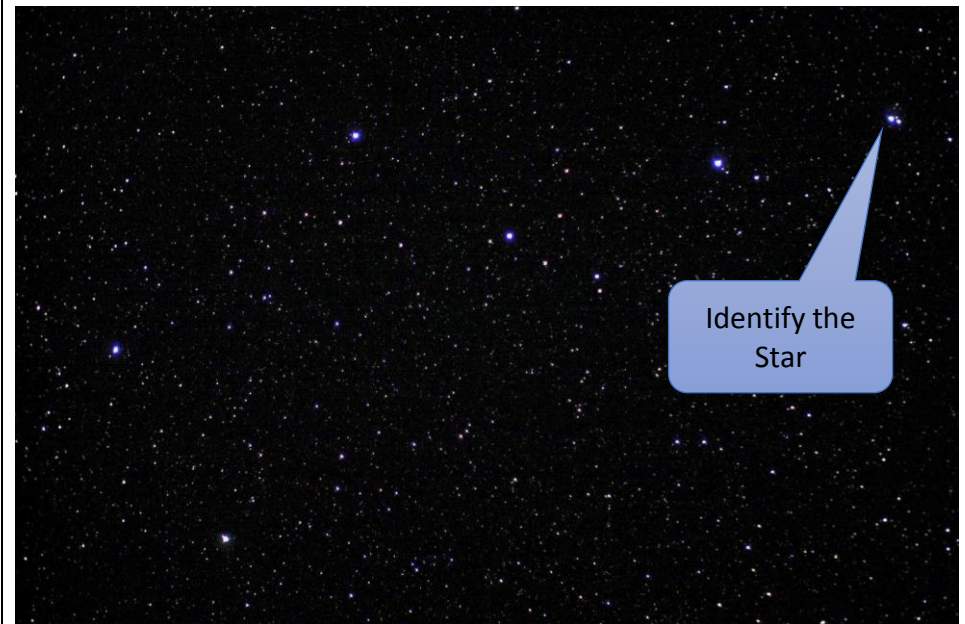


Provide two names for this star

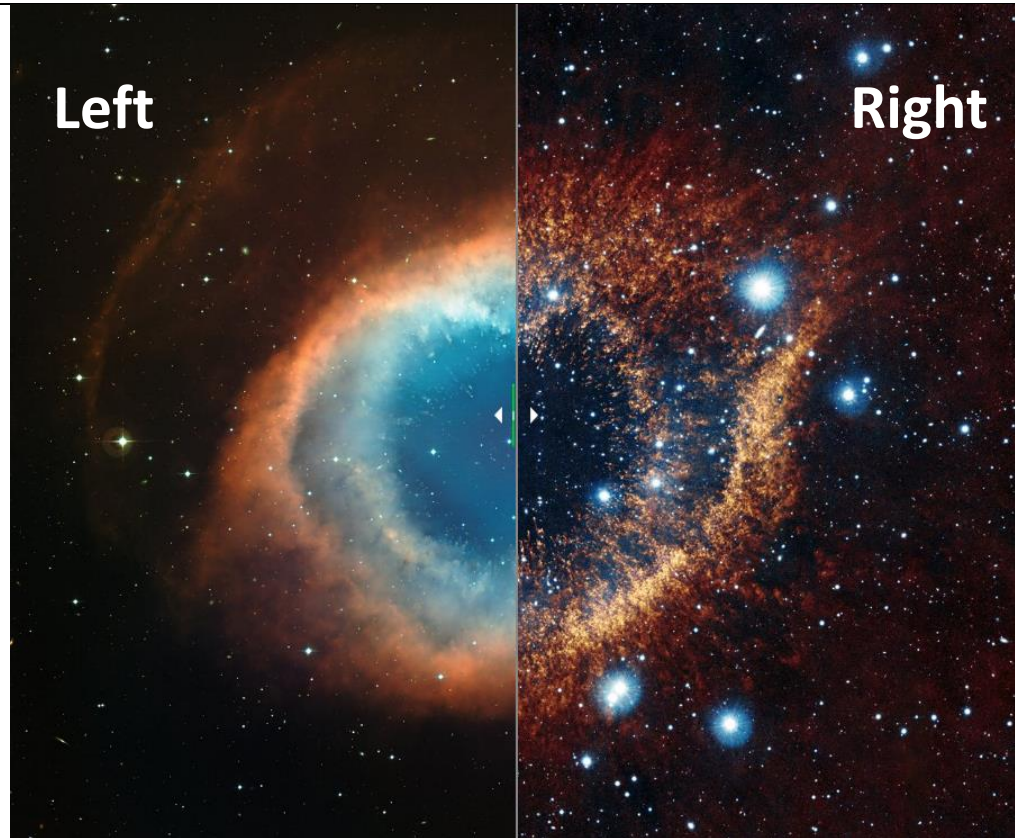
Station 3 – Identify Stars - Set 2



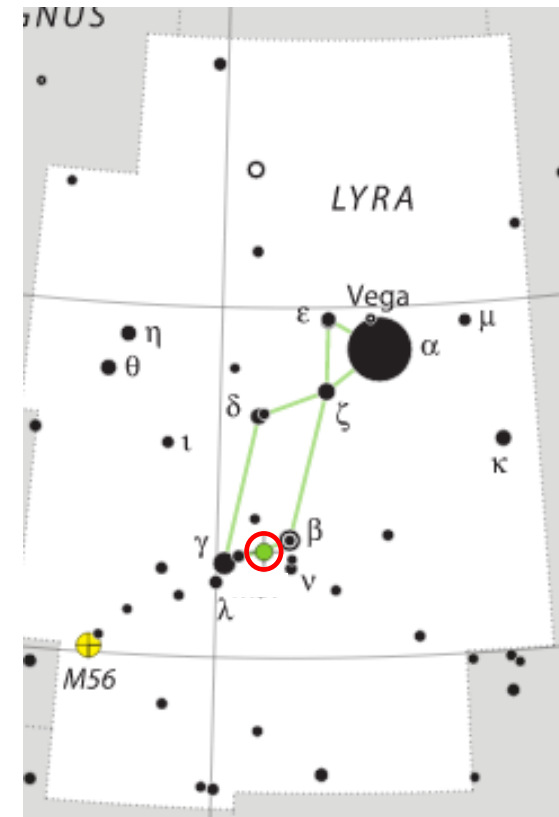
Station 3 – Identify Stars - Set 3

17**18**

Station 4 – Deep Sky Objects (DSO) Set 1



19. Identify this DSO
20. Which wavelengths from the Electromagnetic spectrum were used to create the image “Left”?
21. And image “Right”?



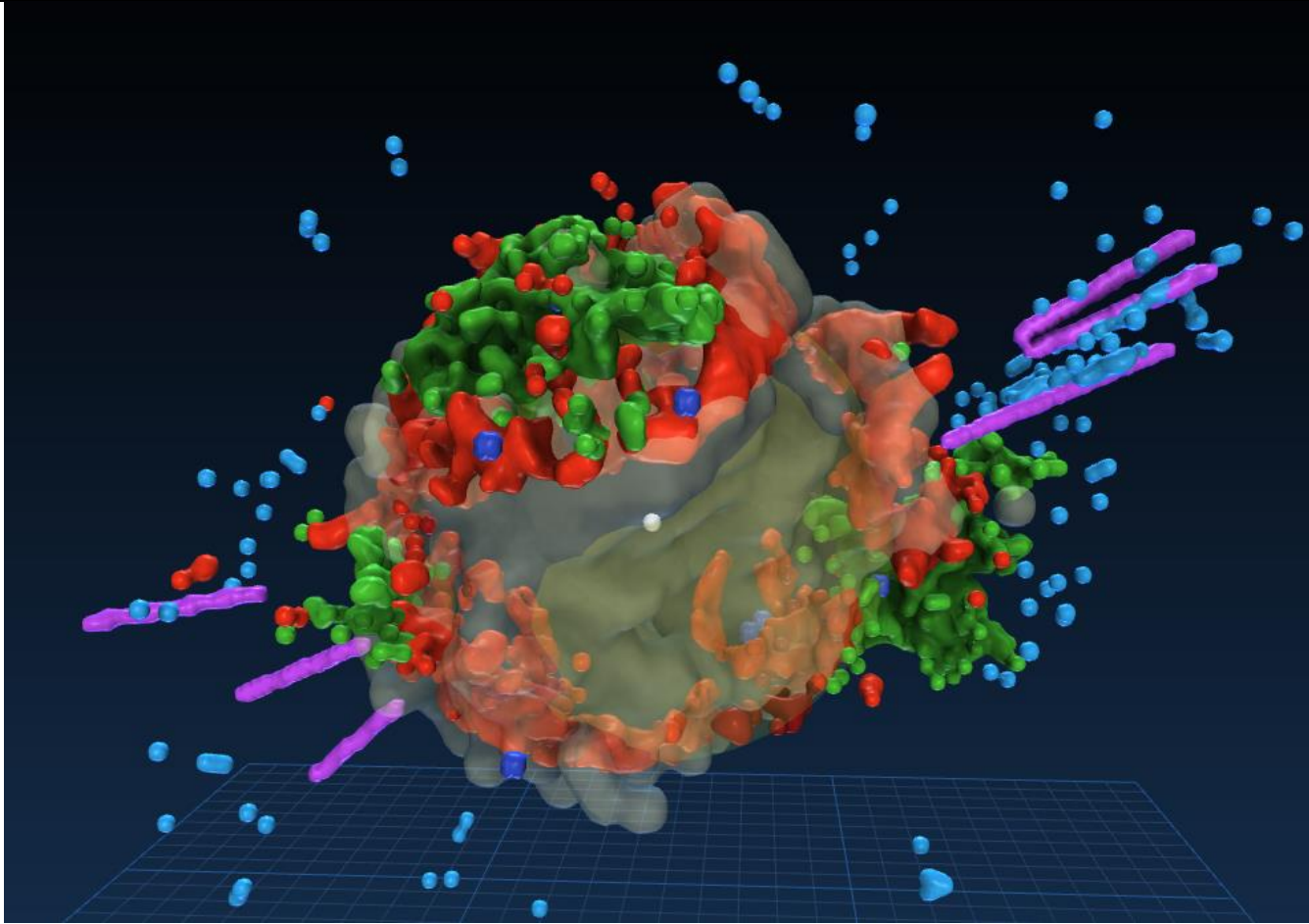
22. Identify the DSO circled in red.
23. What was the previous life stage of this DSO?
24. What is at the center of this DSO?

Station 5 – Deep Sky Objects Set 1



25. Name the DSO on the left portion of this image.
26. Which constellation will you find this DSO in?
27. Will you be able to observe this DSO from Michigan via a telescope?
28. Which element's ions dominate this DSO?

Station 5 – Deep Sky Objects Set 2



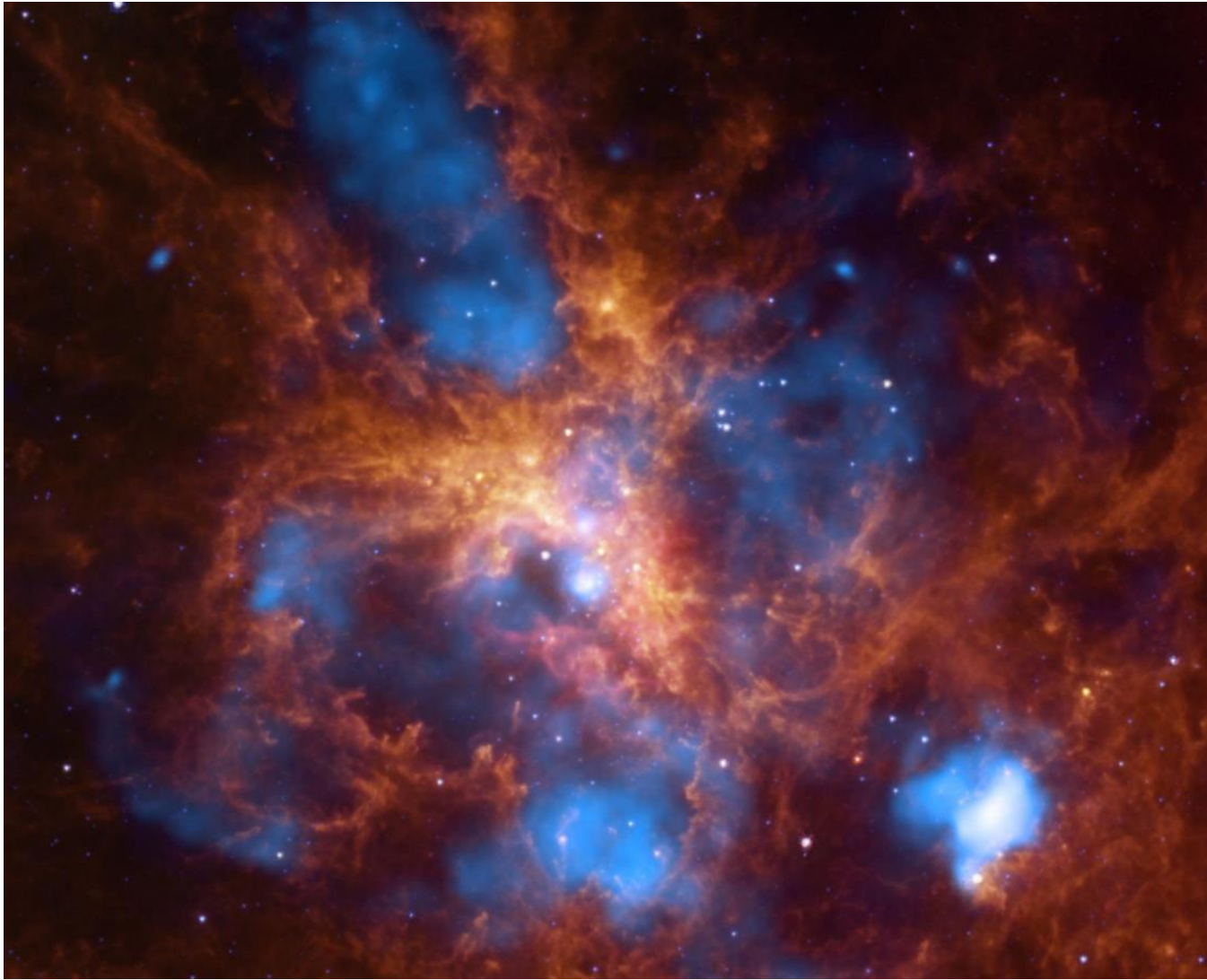
29. What DSO is depicted in this 3D model?

30. This DSO belongs to a constellation which is shaped like one or more letters of the alphabet. Name the letter.

31. What does light green area in the model represent (include the element)?

32. What do the purple structures represent? Which element do they contain?

Station 5 – Deep Sky Objects Set 3

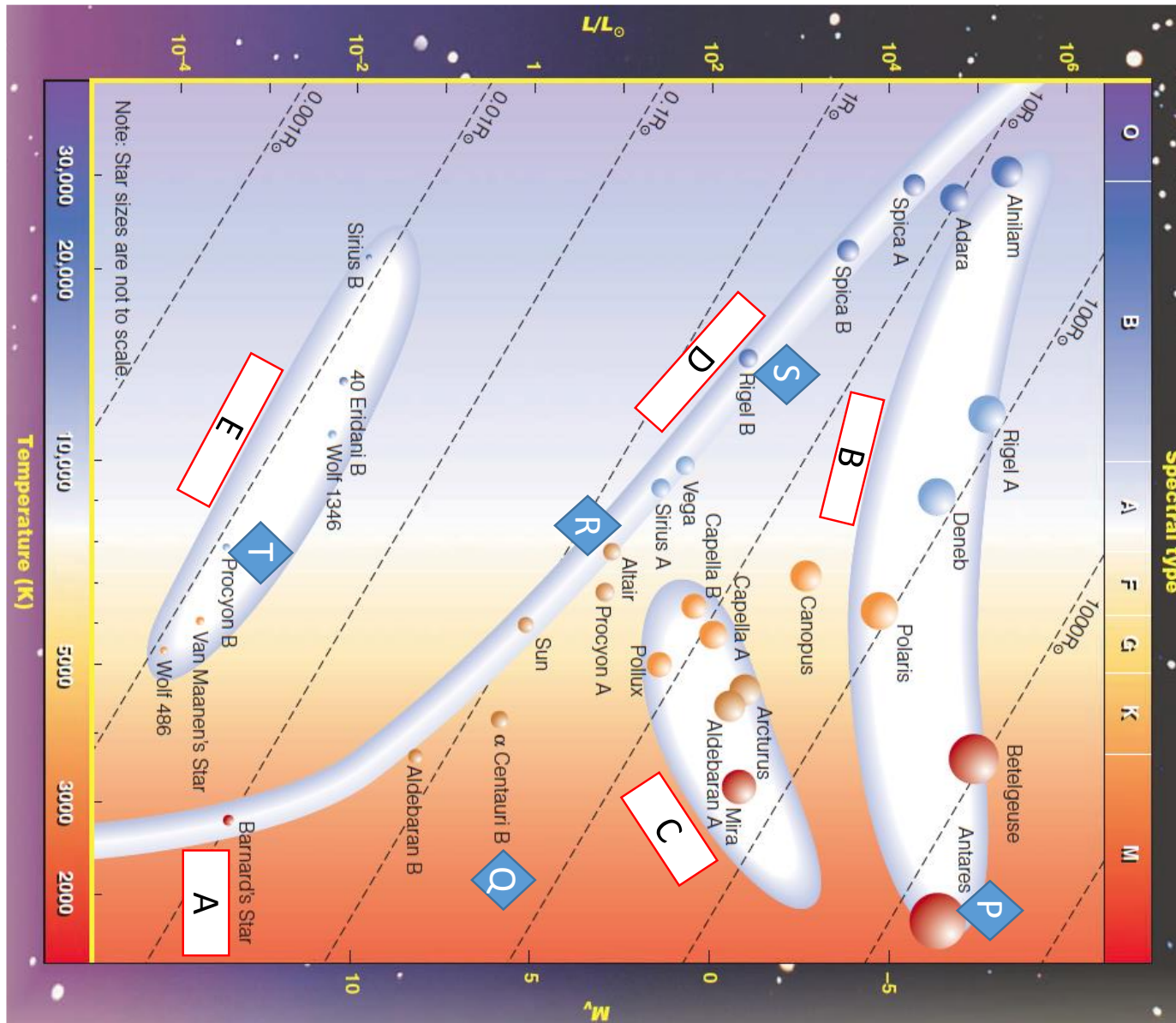


33. Name the DSO

34. Name the galaxy it is part of

35. Name the star cluster or the compact concentration of stars which produce the most energy and make this DSO visible.

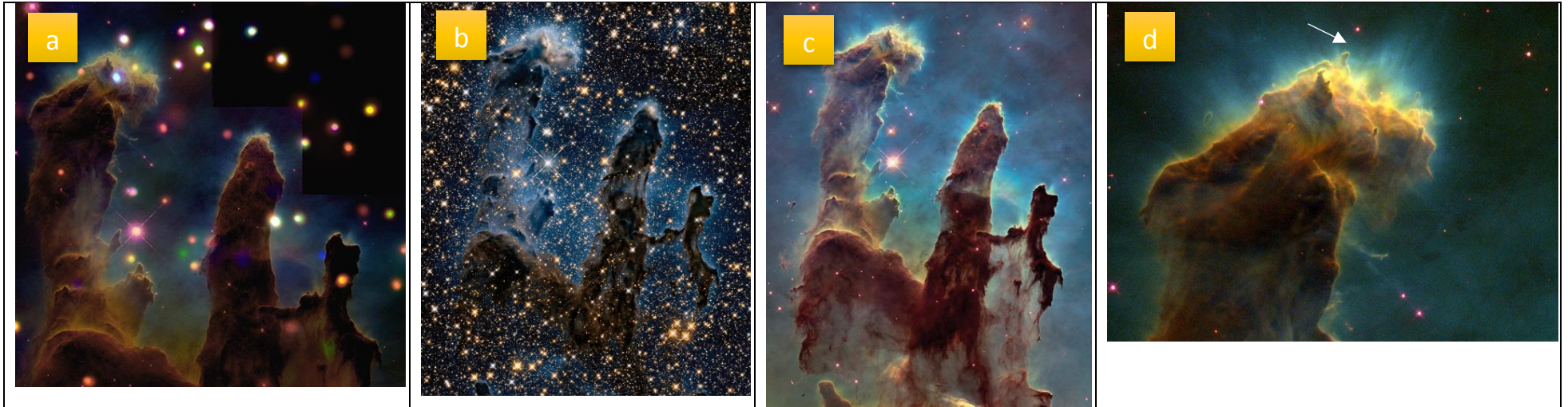
Station 6 – Star Classification



Station 6 – Star Classification - Questions

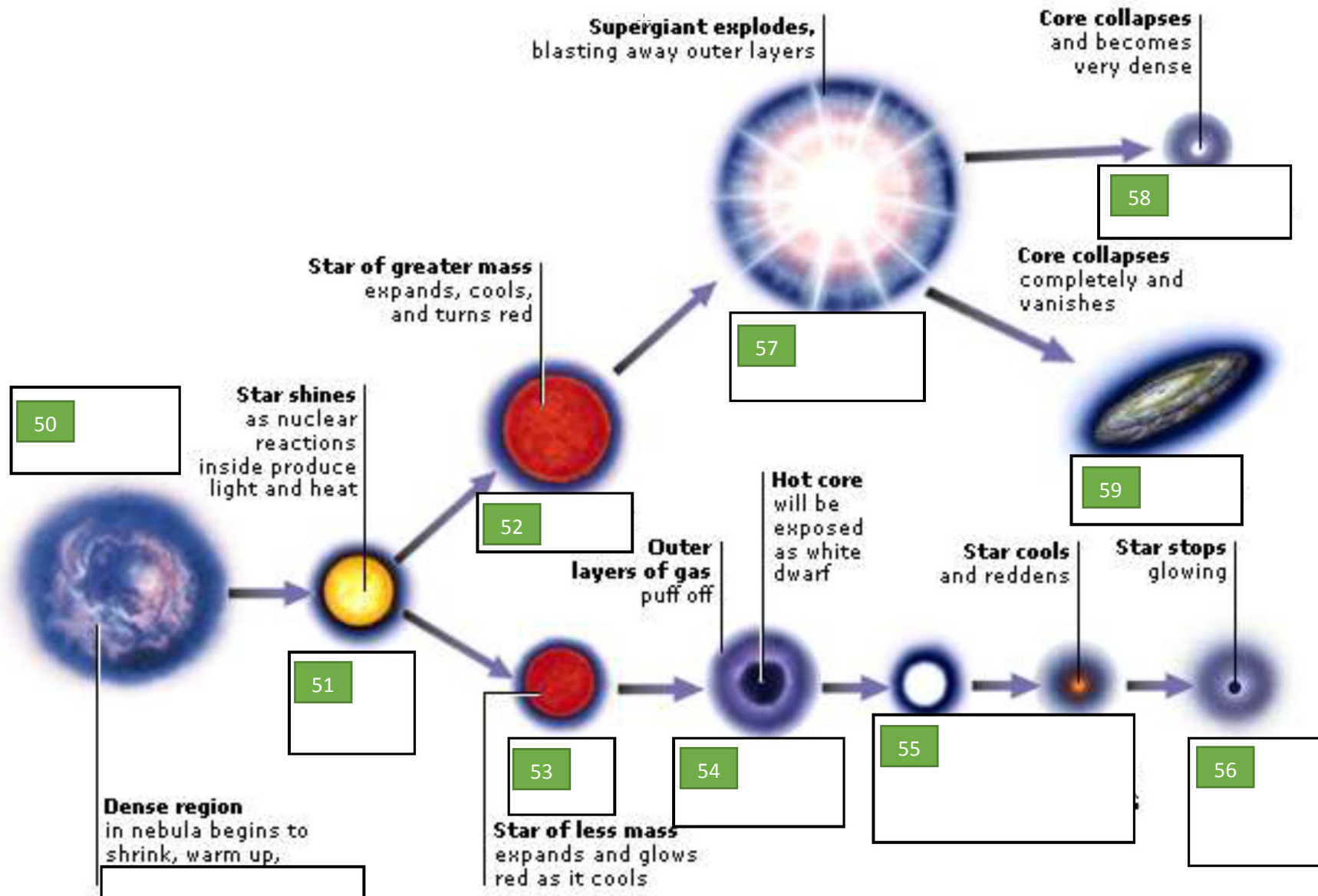
36. Which star is the oldest in terms of the life cycle? – P Q R S T
37. Which star(s) are burning hydrogen as fuel? – P Q R S T
38. Which star is burning Helium as fuel? – – P Q R S T
39. Which star has the highest luminosity? – P Q R S T
40. What causes the star with the highest luminosity to be the brightest?
 - a. Surface temperature
 - b. Size
41. Which star has the lowest luminosity? – P Q R S T
42. Which star has the highest surface temperature? – P Q R S T
43. Predict what phase Rigel B will enter next
 - a. Red Giant
 - b. White dwarf
44. Name groups A to E labeled in white in the diagram
45. What do the dotted lines across the diagram indicate?
46. Which attribute is common to Polaris, Mira, Deneb and Rigel A?

Station 7 – Astronomical Spectroscopy

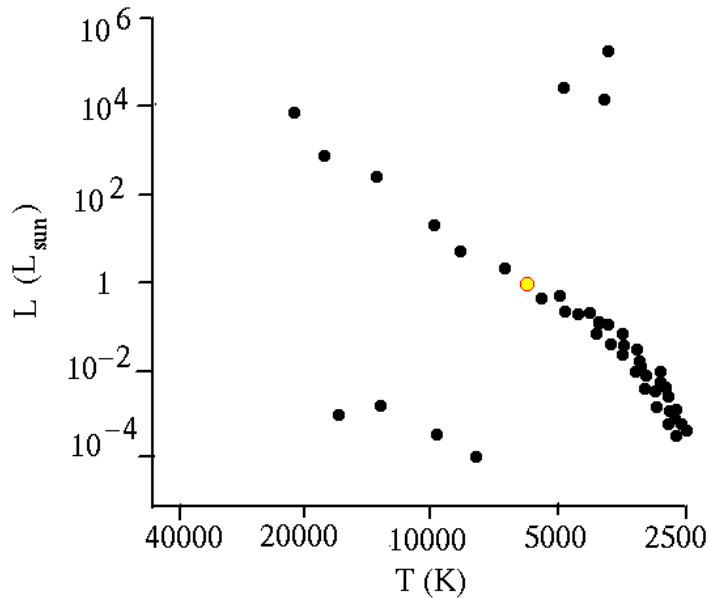


47. Identify the deep sky object depicted in images a, b and c which has been photographed using different spectrums
48. Identify light spectrum used to capture each picture
- a. _____ b. _____ c. _____
- d. List three properties of the distant stars and galaxies which can be derived using Spectroscopy (give 3 examples): i. _____ ii. _____ iii. _____
49. Name the spherical structures indicated by the white arrow on the top side of photo d above (**NO points** will be awarded for abbreviation only answers).

Station 8 – Steller Evolution 1 – Fill in the answers in answer sheet



Station 9 – Stellar Evolution 2



DO NOT DRAW or WRITE on this sheet.

60. Draw the most likely expected lifecycle of our Sun on the HR diagram in your worksheet (1 point). Use arrows to indicate path.
- 1 point each for correctly identifying each phase.
- 1 additional point each for correctly identifying how long Sun will remain in each phase.

Station 10 – General Questions 1

61. Describe Absolute Magnitude
62. Describe Apparent Magnitude
63. Describe Absolute Bolometric Magnitude
64. The difference between the apparent magnitude m (ideally, corrected from the effects of interstellar absorption) and the absolute magnitude M of an astronomical object is known as?
65. A: Unit of Luminosity? _____ B: Unit of Flux? _____
66. Sirius has an apparent magnitude of -1.5 and the Sun has an apparent magnitude of -26.7. What can you conclude from this information?

Station 11 – General Questions 2

67. If we know a star's _____ magnitude, we can infer its distance by comparing absolute and _____ magnitudes.
68. If a star has a parallax of 0.016 arc second and an apparent magnitude of 6.0,
- How far away is it?
 - What is its absolute magnitude?
69. What do you call a pair of stars orbiting around a common center of mass?
70. Review the spectral types of some of the main sequence stars in the table below:

Star	Spectral Type	m_v
A	G2 V	5
B	B1 V	8
C	G2 Ib	10
D	M5 III	19

Which star is:

Q1: Brightest in apparent magnitude?

Q2: Most luminous?

Q3: Largest?

Station 12 – General Questions 3

71. White dwarfs can go supernova when they approach a certain mass. What is the name of this “critical mass”?
72. What type of supernova results from a white dwarf gaining too much mass and exploding?
73. What will a cloud fragment with a mass of 0.02 times the mass of the Sun will evolve into?
74. How can we determine the mass of a star?
75. Two stars are each observed in January and again in July. Star A has a parallax of 1.03 arcseconds, while the Star B has a parallax of 1.70 arcseconds. Which star is closer to earth?
76. What process is the main energy source of the star Aldebaran, a red giant?
77. How does an isolated white dwarf produce energy?